What is claimed is:

1. A magnetic random access memory (MRAM) having a transistor and a magnetic tunneling junction (MTJ) layer in a unit cell, the MTJ layer comprising:

a lower magnetic layer;

an oxidation preventing layer;

a tunneling oxide layer; and

an upper magnetic layer,

wherein the lower magnetic layer, the oxidation preventing layer, the tunneling oxide layer, and the upper magnetic layer are sequentially stacked.

2. The MRAM as claimed in claim 1, wherein the oxidation preventing layer is formed of an AlO_x layer.

3. The MRAM as claimed in claim 1, wherein the tunneling oxide layer is formed of one of an AlO_x layer, an $Al_xHf_{1-x}O_y$ layer, and a Fe_3O_4 layer.

4. The MRAM as claimed in claim 1, wherein the tunneling oxide layer has a repeating structure of sequentially stacked atomic layers.

5. The MRAM as claimed in claim 2, wherein the tunneling oxide layer is formed of one of an AlO_x layer, an $Al_xHf_{1-x}O_y$ layer, and a Fe_3O_4 layer.

6. The MRAM as claimed in claim 1, wherein one of the upper and lower magnetic layers includes a free ferromagnetic layer.

7. The MRAM as claimed in claim 1, wherein a data line is formed in the MRAM to be a magnetic field generating element for writing data to the MTJ layer.

8. A method of manufacturing an MRAM having a transistor and an MTJ layer in a unit cell, formation of the MTJ layer comprising:

forming a lower magnetic layer;

forming an oxidation preventing layer on the lower magnetic layer;

forming a tunneling oxide layer on the oxidation preventing layer; and

forming an upper magnetic layer on the tunneling oxide layer,

wherein the tunneling oxide layer is formed by an atomic layer deposition (ALD) method and at least the oxidation preventing layer is formed by a method other than the ALD method.

9. The method as claimed in claim 8, wherein the oxidation preventing layer is formed using a sputtering method.

10. The method as claimed in claim 8, wherein the lower magnetic layer is formed using one of a sputtering method and an ALD method.

11. The method as claimed in claim 8, wherein the upper magnetic layer is formed using one of a sputtering method and an ALD method.

12. The method as claimed in claim 10, wherein the upper magnetic layer is formed using one of a sputtering method and an ALD method.

13. The method as claimed in claim 8, wherein the oxidation preventing layer is formed of an AlO_x layer.

14. The method as claimed in claim 8, wherein the tunneling oxide layer is formed of one of an AlO_x layer, an $Al_xHf_{1-x}O_y$ layer, and a Fe_3O_4 layer.

15. The method as claimed in claim 13, wherein the tunneling oxide layer is formed of one of an AlO_x layer, an $Al_xHf_{1-x}O_y$ layer, and a Fe_3O_4 layer.

16. The method as claimed in claim 8, wherein one of the upper and lower magnetic layers includes a free ferromagnetic layer.

17. A method of manufacturing an MRAM having a transistor and an MTJ layer in a unit cell, the MTJ layer having middle oxide layers formed by a hetero-method, the method comprising:

forming the transistor including a gate stacking material and source and drain regions in an active area of a substrate;

forming a pad conductive layer on an interlayer insulating layer formed over the transistor, the pad conductive layer being electrically associated with the drain region of the transistor;

forming the MTJ layer in a predetermined area of the pad conductive layer corresponding to a data line formed under the pad conductive layer by sequentially depositing a seed layer, a lower magnetic layer, an oxidation preventing layer, a tunneling oxide layer, and an upper magnetic layer; and

patterning the upper magnetic layer, the tunneling oxide layer, the oxidation preventing layer, the lower magnetic layer, and the seed layer to form the MTJ layer,

wherein the tunneling oxide layer is formed by an atomic layer deposition (ALD) method and at least the oxidation preventing layer is formed by a method other than the ALD method.

18. The method as claimed in claim 17, wherein the upper and lower magnetic layers are formed using one of a sputtering method and an ALD method.

19. A method of manufacturing a magnetic tunneling junction (MTJ) layer having middle oxide layers formed by a hetero–method, the method comprising:

forming a seed layer;

forming a lower magnetic layer including a pinning layer and a pinned layer on the seed layer;

forming a metal layer on the lower magnetic layer;

oxidizing the metal layer to form an oxidation preventing layer on the pinned layer of the lower magnetic layer;

sequentially forming a tunneling oxide layer and an upper magnetic layer on the oxidation preventing layer; and

patterning the upper magnetic layer, the tunneling oxide layer, the oxidation preventing layer, the lower magnetic layer and the seed layer to form the MTJ layer,

wherein the tunneling oxide layer is formed using an atomic layer deposition (ALD) method and at least the oxidation preventing layer is formed using a method other than the ALD method.

20. The method as claimed in claim 19, wherein the upper and lower magnetic layers are formed using one of a sputtering method and an ALD method.

21. The method as claimed in claim 8, wherein forming the oxidation prevention layer comprises:

forming a metal layer on the lower magnetic layer; and

oxidizing the metal layer.